IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Olivier Theytaz et al.	Examiner: David Lee Lewis
Serial No.:	10/826,424	Group Art Unit: 2629
Filed:	April 15, 2004	Docket No.: 010C-02300
Title:	MULTI-LIGHT-SOURCE ILLUMINATION SYSTEM FOR OPTICAL POINTING DEVICES	

Declaration under 37 C.F.R. 1.131

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

We, the undersigned inventors, hereby declare and state as follows:

1. We are the co-inventors of the subject matter recited in the pending claims of the above-mentioned application.

2. Prior to October 30, 2003, we conceived of, and worked diligently subsequent to conception to reduce to practice, the invention disclosed in the above-referenced application, and claimed in the pending claims, as evidenced by the following:

- Exhibit A is a copy of pages from the notebook of the first-named inventor, Olivier Theytaz, outlining some of the ideas in the present application dated March 21, 2003. These pages have also been counter-signed by another co-inventor, Olivier Mathis, on March 21, 2003.

- Exhibit B is a copy of an Invention Disclosure Form (IDF) created by us on March 21, 2003, for consideration of the idea for patenting, in accordance with the policies of the assignee of the present application. It can be seen from the editor history noted towards the end of Exhibit B, that diligent work was performed towards filing the patent application in the U.S. Patent and Trademark Office from March 21, 2003, when the IDF was created, through 23 March, 2004. The IDF passed through the then standard evaluation for patenting process per the policies of the assignee of the present invention. (Please note that there is an erroneous entry in this section, stating "The application is fil(l)ed by Kristine Riley on 27.Jan.04". This was not the case. As noted above, the application was filed with the U.S. Patent and Trademark Office on April 15, 2004.)

- Exhibit C is a copy of an email from Rajiv Patel, a patent attorney at Fenwick & West LLP, to the first-named inventor, Olivier Theytaz, written on February 6, 2004, requesting an interview to discuss the ideas in the present application. Hector Ribera, another patent attorney at Fenwick & West LLP, is copied on the same.

- Exhibit D is a copy of an email exchange between Hector Ribera and the first-named inventor, Oliver Theytaz, dated March 9, 2004, regarding progress on the present application.

- Exhibit E is a copy of an email from Hector Ribera to the first-named inventor, Olivier Theytaz, written on March 16, 2004, enclosing a draft of the present application for review.

3. As noted above, the present application was filed with the U.S. Patent and Trademark Office on April 15, 2004.

4. We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and believe are believe to be true; and further that these statements were made with the knowledge that willful false statements, and the like, are punishable by a fine or imprisonment, or both, under §1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: 1st of April 08 By: _____
Olivier Theytaz

Dated: April 1st, 2008 By: _____
Olivier Mathis

Dated: April 18th 2008 By: _____
Baptiste Merminod

Dated: April/2/08 By: _____
Pascal Eichenberger

Enclosures: Exhibit A
Exhibit B
Exhibit C
Exhibit D

Exhibit E

Exhibit A

March 21st 2003

Dual illumination system for optical mouse

Agilent lens system have a broad angular spectrum going from 3° → 30°. Optimum 4, Optilens and Optimum 1b all have the same illumination with a narrower angular spectrum but close to the 30° (from 25° → 30°).

The broad angular spectrum contains low angles (with respect to horizontal) that are good for low contrast surface. It seem that higher angles are better on wood.

A broad angular spectrum is not necessarily an advantage as the LED beam direction tolerancing plays a big role on the spot position. If the spot position varies so do the angle of the rays impinging on the area of interest - that is - the one below the imaging lens.

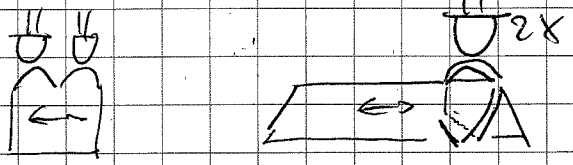
The solution proposed here use a dual light source at two different angles so that the angular spectrum is divided by two: an low one (10° → 15°) and a high one (15° → 25°). The tracking engine - depending on its setup for example - can then switch between the high or low illumination angle.
This might contribute - at the expense of one supplementary LED - to simplify the algorithms currently used.

Various configurations exists to implement the above described solution:

(A)

dual LED vertically stacked. One LED dep. 2 adjacent illumination lens

(B) Canopea style



2 LEDs adjacent
2 illumination system adjacent but in one single plastic part
no led clip as there LED are of SMD type on PCB

(C)

same as (A) but LEDs are split on each side of the part.
2 LEDs, 2 LED clips

In C solution LED are not necessarily aligned. They can be placed at 90°. A mix between C and B can also be imagined.

O. Theytaz, Romanel 21.03.03

Reed and understood, March 21/2003
Olivier Mathis

Exhibit B

Logitech Confidential Attorney-Client Communication

Invention Disclosure Form

ID	200303210858/11
Firm File #	
*Invention Title:	Dual illumination system for optical mouse associated with passive optical filtering
*Authors Names:	Olivier Theytaz, Olivier Mathis, Baptiste Merminod, Joao Ventura
*Inventors Names:	Olivier Theytaz; Olivier Mathis
*Business Unit:	CD
Target Product Unit	Retail pointing devices
Type	Utility
Firm	
Firm Esq	
Date Assigned	27.Jan.2004

Background Information for Invention:

1. Problem invention will now solve:

Illumination angle (angular spectrum) of the illumination optics used in our mice (Optimum, Optilens illumination generation) and passive optical filtering.

Let's first describe what is the angular spectrum: it is the angular distribution of all the impinging rays that participate to the surface illumination right beneath the imaging lens (field of view). Nowadays this angular spectrum width is either too large (HDNS2100) or too narrow (Optimum, Optilens). For each type of solution the centroid angle value is not the same. The rays at low angle (7-10° with respect to horizontal) are more sensitive to positioning error and the scattered optical energy towards the imaging lens is lower compared to rays at higher angle (25°). However low angle rays are better for low contrast surface (white paper...) whereas higher angle rays might have better advantages for patterned surface as wood for example.

The potential benefit of passive optical filtering is to provide a low cost filtering function that is not placed in algorithm.

2. Summary of the invention (including features):

(Attaching figures and flowcharts to briefly explain the invention is encouraged).

Having a broad angular spectrum might not necessarily be a big advantage. Due to the LED beam direction tolerancing the rays contributing to the scattering are not of the same angle for all mice of the same assembly type (recurent problem with mice assembled with HDNS2100). The solution proposed here is to have two source of light (or more, possibly at different wavelength!) with 2 illumination optics (or more) so that the tracking engine can use each of them depending of the surface (possibly the two of them at the same time). The two (or more) source can have their beam crossing at any necessary angle (from parallel to perpendicular, e.g 45°) with respect to a top view.. More generally the illumination (assuming the spot is well centered) is a function of :

1. the wavelength

2. the impinging angle
3. the homogeneity
4. the intensity

Thus the illumination sources (2 or more) can be any combination of the above points such that each illumination source will individually bring an advantage compare to the other one. Associated to that a passive filtering could be added to the imaging lens using obstruction and not only an aperture (a combination of the two is also possible). By that mean the right features can be put in evidence thanks to the right illumination and the undesirable low spatial frequencies could be removed thanks to the obstruction in the imaging lens (bandpass filter).

3. Benefits/advantages of the invention

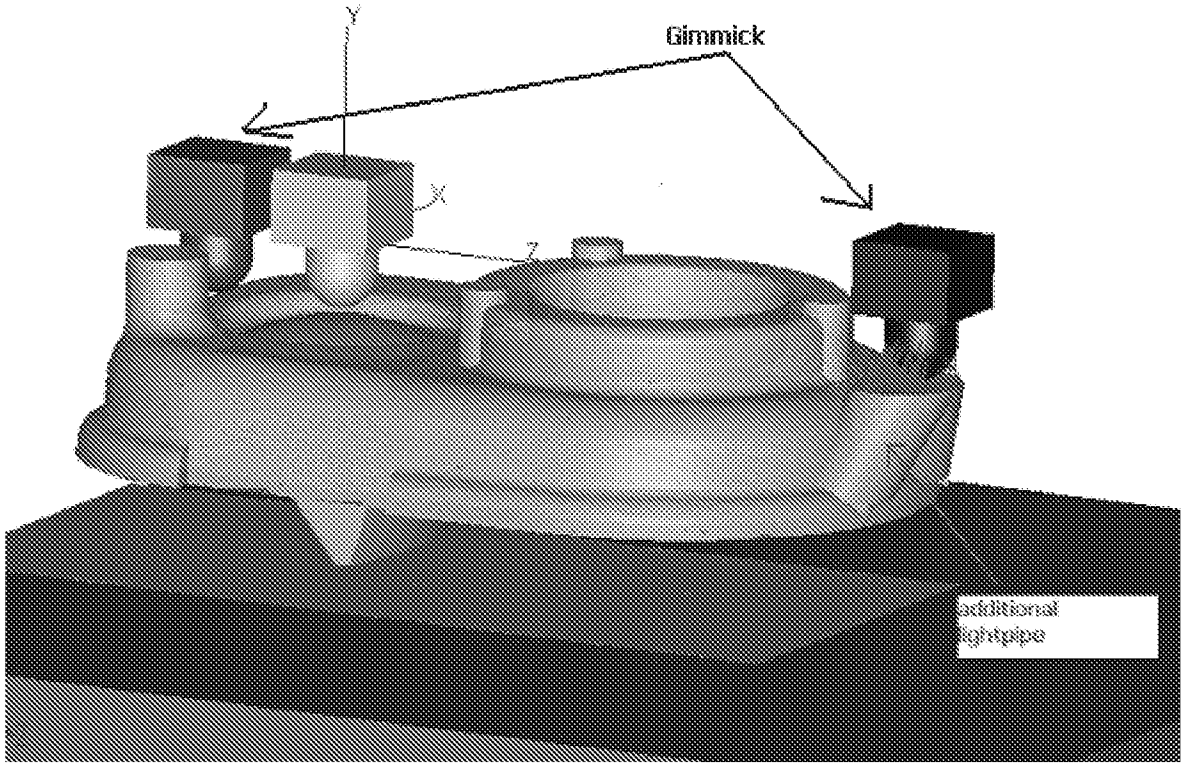
This can bring a extremely robust solution for tracking at the cost of an extra LED (if two source of illumination). Possibly silicon size due to algorithm simplication can be another asset.

As said under point 2, the sources of illumination can have different wavelenght. This means that - in case of 2 light sources - one can be infra red (IR -not visible to the human eye) and the other can be visible (blue, red, amber, green, white...). It could also allow some kind of decoration. Possibly one of the light source could have a non functional role but only serve for decoration (colored led). A solution in that case would be to inject the light in some area of the lens (lens is used here as the part name which is a mechanical part that has optical area) where the visible light coud diffuse without perturbating the functional optical paths in infra-red.

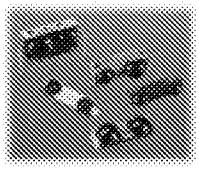
The strategy for the decoration (gimmick) light can be as follow:

1. led continuously on. But the disadvantages are the power consumption for cordless devices and the fact it can be harmful for the tracking by polluting the desired infra-red signal (bad signal to noise ratio on the sensor itself)
2. the decoration led is on only when the mouse is lifted up. The benefits are that a) the decoration light will not harm the tracking as we are precisely in a non-tracking situation and b) it consumes power only this lift up seldom case. This last case b) appears when the mice is not flat on the surface and thus the user will be warned by a visible light. This first situation a) appears when the user looks at the bottom case of its mice for the following reasons:
    1. to see if his optical mouse is switched on. In fact people are used to see the red light with current products and thus know if the mouse is 'working'
    2. to switch on the mouse which might have an on-off button such as Elba. In that case the turn on will be directly visible because both conditions (lifted up and on-off switch is on) are true.

There are mainy ways to detect the lift detection (Marc Bidiville worked on that topic, maybe an IDF is existing on that topic), e.g. to use the lift detection signal of the sensor, to use an optical barrier, to use an RED contact + a magnet (inside the mouse), a switch that touch the tracking surface (switch off when lifted...). All of them can have cost effective implementation.


Y
Gimmick
X
Z
additional
lightpipe

Furthermore the lens (as opto-mechanical part) could be colored for decoration purpose. Using infra-red source would allow the lens to be colored in 'black' or red and could bring some decoration effect. This is however not compatilbe with decoration due by color light injected in the lens itself as the color of the lens would be a visible light blocking filter but passing filter for infra-red (IR) .



Basic Legal Criteria for Invention: (Please Note: Tell us what you know now. Do not look for Patents.)

1. Has the invention been disclosed to non Logitech employees without a NDA ?
   Date of Disclosure 03/21/2003

Expected date it will be disclosed

2. Has or will the invention be described in a printed publication, a conference proceeding, etc.?
   If so, when?
   no
3. Has or will the invention be offered for sale or on sale?
   If so, when?
   no

Priority Considerations for Invention: (Please Note: Tell us what you know now. Do not look for Patents.)

1. Is the invention in a field without competition? If No, who are the competitors?
   no, but for the moment there is no such invention.
2. What other considerations that should be accounted for (*e.g.*, market leadership or perception, new technology area, etc.)
   technical leadership. could be a strong advantage for 'perfomance' products.
3. What is the estimated life of the technology? For how long will Logitech use the technology?
   as long as we have optical mouse
4. Will a workaround to the invention be difficult (consider time, expense, complexity)?
   If No, can the description of the invention include most feasible workaround solutions?
   yes as it will be obvious to see if an equivalent system is used by competitors
5. Will it be easy to detect infringement of the invention (*e.g.*, would the infringement be visible)?
   How can infringement most probably be detected?
   yes

Attachment/comments:

Patent Application Doc Link:

Created by Olivier Theytaz on 21.Mar.2003
Modified by Olivier Theytaz on 21.Mar.2003
Submit for approval by Olivier Theytaz on 21.Mar.2003
Modified by Olivier Theytaz on 24.Mar.2003
Modified by Olivier Theytaz on 14.Apr.2003
Request more information by Aldo Bussien on 15.Apr.2003
Modified by Olivier Theytaz on 15.Apr.2003
Modified by Olivier Theytaz on 12.May.2003
Modified by Olivier Theytaz on 2.Jun.2003
Submit for approval by Olivier Theytaz on 3.Jun.2003
Tabled by Aldo Bussien on 7.Oct.2003
Modified by Olivier Theytaz on 16.Jan.2004
Submit for approval by Olivier Theytaz on 16.Jan.2004
Approved by Aldo Bussien on 16.Jan.2004
IDF assigned by Kristine Riley on 27.Jan.2004
Modified by Kristine Riley on 27.Jan.2004
The application is filled by Kristine Riley on 29.Jan.2004
Modified by Olivier Theytaz on 22.Mar.2004
Modified by Olivier Theytaz on 23.Mar.2004

Exhibit C

"Rajiv Patel" <RPatel@fenwick.com>	To	"Olivier Theytaz (E-mail)" <olivier_theytaz@logitech.com>
	cc	"Hector Ribera" <HRibera@fenwick.com>
02/07/2004 02:06 AM	Subject	LOGI 08802: New Disclosure

PRIVILEGED & CONFIDENTIAL

February 6, 2004

RE: New Patent Application Disclosure
"DUAL ILLUMINATION SYSTEM FOR OPTICAL MOUSE"
Our Reference: 19414-08802\

Hello Olivier!

I hope this email finds all is well with you. I understand things are quite busy at Logitech Switzerland. I am writing to let you know that Kristine has provided us the go-ahead to move forward on the above-referenced patent application. Hector and I would like to schedule time with you next week to further discuss the invention. Would Monday at 5:00 PM CH (8:00 AM California) time or Tuesday at 6:15 PM (9:15 AM California) CH time work with your schedule? If not, what would be alternative times that would work with your schedule?

Regards,
Rajiv

****
Rajiv P. Patel
Partner, Intellectual Property Group
Fenwick & West LLP
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Exhibit D

-----Original Message-----
From: Olivier_Theytaz@eu.logitech.com
[mailto:Olivier_Theytaz@eu.logitech.com]
Sent: Tuesday, March 09, 2004 11:15 PM
To: Hector Ribera
Cc: Kristine Riley (E-mail); Rajiv Patel
Subject: RE: LOGI 08802: New Disclosure

Hello Hector

Thanks for your update. I am looking forward to receiving your draft early next week.

Regards

Olivier

"Hector Ribera" <HRibera@fenwick.com> 03/09/2004 07:48 PM

To: Olivier_Theytaz@eu.logitech.com
cc: "Kristine Riley (E-mail)" <kristine_riley@logitech.com>, "Rajiv Patel" <RPatel@fenwick.com>
Subject: RE: LOGI 08802: New Disclosure

CONFIDENTIAL - ATTORNEY CLIENT COMMUNICATION

Hello Olivier,

I have finished a preliminary draft of the specification and I currently working on shaping up the claims. We will need to go through a couple of revisions before we can send you a draft for your review and comments. I think we will be able to send you a draft by early next week. Please, let us know if anything has changed with respect to either technical changes or improvements or any public disclosure, offer for sale, public use, or the like.

Regards,
Hector.

Hector J. Ribera, Esq.
Fenwick & West, LLP
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Mountain View, CA 94041
Tel: 650.335.7192
Fax: 650.938.5200
Mailto:hribera@fenwick.com
www.fenwick.com

Exhibit E

"Hector Ribera" <HRibera@fenwick.com>

03/16/2004 10:41 AM

To: Olivier_Theytaz@eu.logitech.com

cc: "Kristine Riley (E-mail)" <kristine_riley@logitech.com>, "Rajiv Patel" <RPatel@fenwick.com>

Subject: RE: LOGI 08802: New Disclosure

PRIVILEGED AND CONFIDENTIAL - ATTORNEY CLIENT COMMUNICATION

March 16, 2004

RE:	Review of Patent Application Draft
Title:	Dual Illumination System for Optical Mouse
Inventors:	Theytaz, Mathis, and Meriminod
Attorney Docket No.:	19414-08802

Dear Olivier,

We are pleased to enclose for your review and comments a draft of above-referenced patent application. Please, provide copies to the other named inventors as necessary. On this note, we kindly request that you review the names of the persons listed as inventors and in view of the claims, please let us know who should be properly listed as an inventor. That is, who contributed to the conception of the inventive elements recited in the claims. This is a very critical issue as the requirements for filing the application in the U.S. and other countries will vary accordingly.

Please also examine the application carefully for technical accuracy and completeness. Please be advised that the patent specification must (1) disclose the invention in sufficient level of detail to enable one skilled in the art to practice the invention and (2) describe the best mode that you know of for practicing the claimed invention. Accordingly, the patent application should contain sufficient information to enable one skilled in the art to implement the invention.

Please thoroughly review the specification and drawings, and make all corrections or additions that are necessary. We we felt more information could be provided, we noted it with a parenthetical enclosing a capital "Q:" followed by a comment, question, or request for more information. Feel free to insert additional pages of comments if necessary, or to suggest changes to the drawings. This will help facilitate the process for filing the patent application with the United States Patent and Trademark Office. We have also included a set of draft claims. After you complete your review we can discuss additional sets to include in this application (or divisional application, if appropriate).

Please note that once the patent application is filed with the United States Patent and Trademark Office, we will not be able to make substantive changes to the specification without losing the benefit of the filing date. The earliest filing date is desired in order to limit the amount of prior art that may be cited against the patent by the United States Patent and Trademark Office. Accordingly, please make sure your comments are complete and accurate.

In addition, we would like to remind you to keep us informed with respect to any public disclosure of any of the features convered by this application. As of the last time we spoke, some of these features were

already embodied in internal prototypes but none had been publicly disclosed. If there have been any changes that may trigger a barring date, please kindly let us know.

Please do not hesitate to contact me or Rajiv Patel if you have any questions. My contact information is listed below. Rajiv's direct dial is (650) 335-7607 and his email is rpatel@fenwick.com. Thank you for your help.

Sincerely,

Hector.

Hector J. Ribera, Esq.
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